Abstracts

A full-wave modal analysis of arbitrarily shaped waveguide discontinuities using the finite plane-wave series expansion

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A full-wave electromagnetic model for analyzing waveguide discontinuities of arbitrarily shaped piecewise planar boundaries is presented. The analysis is facilitated by using the finite plane-wave series expansion of circular cylindrical modal functions. Since electromagnetic fields on each of the planar boundary surfaces of the inhomogeneous region are expressed in terms of plane-wave modal functions, the complete solution is carried out analytically without any numerical integration. To verify the formulation, a number of practical waveguide components are analyzed. The calculated results are compared with other full-wave electromagnetic models. Excellent agreement is obtained for all the cases.

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